

# JFSP Project Highlights

## Research Supporting Sound Decisions

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The JFSP, a partnership of six federal wildland fire and research organizations, provides scientific information and support for fuel and fire management programs.

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### Fire Effects on Northern Mixed Grass Prairies

Joint Fire Science Program supported researchers Ron Wakimoto, Earl Willard, Robert Murphy, Todd Grant, and Elizabeth Madden have taken a closer look at how fire is shaping prairie vegetation, soil cover, and bird populations; this is what they discovered from two separate investigations of northern mixed grass prairies.



#### What are Fire Effects on Grassland Plant Communities?

Scientists took a closer look at 10-year plant responses to burning prairie grasslands:

- Fire had little effect on percent cover of shrubs, native grasses and forbs, and invasive plants.
- Plant species response to burning varied, but most plants returned to pre-burn densities within 10 years after fire.
- Organic and litter cover were immediately reduced by burning, but were mostly replenished on sites burned more than 10 years ago.
- Basal vegetation was reduced on burned sites one to two years after fire and remained lower for the first 5 years when compared to unburned areas.
- The percentage of dead vegetation, litter depth, and maximum vegetation height were greatly reduced for one to two growing seasons following fire, but generally recovered to pre-burn conditions within 3 to 10 years.



#### What are Fire Effects on Prairie Soils?

- Vegetative surface protection was reduced for at least 5 years following fire.
- Gravel and bare-ground cover were higher on burned than on unburned sites, but returned to pre-burn conditions of approximately 6 percent cover within 10 years after burning.



#### What are Fire Effects on Grassland Birds?

Grassland birds are well adapted to fire and most bird species populations returned to pre-burn conditions during the second or third growing season after fire. Scientists found:

- Reduced numbers of bobolink, clay-colored sparrow, Savannah sparrow, Le Conte's sparrow, sedge wren, and western meadowlark during the first growing season following fire.
- No change in the numbers of brown-headed cowbirds and grasshopper sparrows.
- Little change in nest survival for most grassland bird species.
- Savannah sparrow nest survival decreased the first growing season after fire because of nest parasitism by brown-headed cowbirds.

- Clay-colored sparrow, Savannah sparrow, mallard, and gadwall nest densities declined during the first growing season after fire.
- Blue-winged teal, northern pintail, and northern shoveler nest densities were unaffected by fire.
- Bobolink nest densities were highest during the first two growing seasons following fire.

### **What is the Effect of Tall Woody Vegetation (Shrubs and Stunted Trees) on Songbird Nest Survival?**

Reduced nest survival may be caused by a local abundance of nest predators or by increased parasitism by brown-headed cowbirds as a function of the proximity of tall woody vegetation. Researchers found:

- Nest survival of clay-colored sparrows declined as the number of patches of tall woody vegetation increased within 200 meters of the nest.
- In contrast, Savannah sparrow nest survival is unaffected by tall woody vegetation.

### **In Summary**

Vegetation, soil cover, and animals generally returned to pre-burn conditions within 10 years after fire. However, increases in tall woody vegetation in response to reduced fire frequency over the past 100 years may have facilitated reductions of some bird populations.

### **Authors and Cooperators**

"Historic Fire Regimes and Change Since European Settlement on the Northern Mixed Prairie: Effect on Ecosystem Function and Fire Behavior" (JFSP project 98-1-5-04)

#### **Investigators**

Ronald H. Wakimoto, Professor of Fire Science E. Earl Willard, Professor of Range Science College of Forestry and Conservation, University of Montana, Missoula, MT 59812

#### **Cooperators**

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"Prescribed Fire for Fuel Reduction in Northern Mixed-Grass Prairie: Influence on Habitat and Populations of Indigenous Wildlife" (JFSP project 01-3-2-09)

#### **Investigators**

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USFWS-DesLacs National Wildlife Refuge, USFWS-J.Clark Salyer National Wildlife Refuge, USGS-Northern Prairie Wildlife Research Center, University of Missouri, University of North Dakota

### **On the Web**

A list of publications on these JFSP supported projects and related fire research on National Wildlife Refuges in the northern mixed grass prairie can be found at:

<http://deslacs.fws.gov/pubs.htm>

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